



Metro™ Series

Mobile Computing Workstations

MPS-4009

Multi-Chemistry

Power Supply



Operations Manual Supplement

L01-497 RevD

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<http://www.metro.com/support>

FCC Information:

This device complies with FCC Rules, part 15. Operation is subject to the following conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference that may be received, including interference that may cause undesired operation.

Notice: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the user's expense.

Warning: Changes or modifications to this device not expressly approved by InterMetro Industries Corporation could void the user's authority to operate this equipment.

Shielded cables must be used with this unit to ensure compliance with the FCC Class A limits.

Industry Canada:

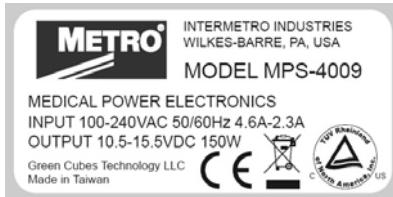
This class A digital apparatus meets all requirements of the Canadian Interface Causing Equipment Regulations. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Regulatory Compliance

This system was tested and complies with UL 60601-1, CAN/CSA C22.2 No.601.1 and IEC/EN 60601-1-1 medical safety standards.

Symbol Explanations



The product is TÜV certified with respect to electrical shock, fire and mechanical hazards only in accordance with UL 60601-1, CAN/CSA 22.2 No. 601.1 and IEC/EN 60601-1-1 as Type B Patient Care Medical Equipment suitable for use in patient vicinity.



Attention, consult accompanying documents

Important Safety Instructions

This document contains important safety and operating instructions for the MPS-4009 Power Supply. Please read all instructions and cautionary markings before putting it into service on a Mobile Computing Workstation.

**Caution:**

User maintenance consists of cleaning, periodic tightening of fasteners and the like. For safety purposes, any and all servicing other than the procedures detailed in the Maintenance section of this manual must be performed by qualified service personnel only. For all service items, please contact InterMetro Customer Service.

**Caution:**

Do not operate an MPS-4009 Power Supply or associated Metro Series Mobile Computing Workstation if either has received a severe impact, been knocked over, fallen down stairs, or otherwise been physically damaged. Please have a qualified service person inspect both the Mobile Computing Workstation and the Power Supply for any performance or safety hazard prior to putting it back into service.

**Caution:**

Ensure that the AC power supply cord is located and secured so that it will not be stepped on, tripped over, or otherwise subjected to damage or stress. Please secure the AC power cord plug in the retaining clips provided on the Mobile Computing Workstation when it is unplugged from the AC outlet in order to prevent accidental tripping and physical damage to the cord plug or electrical insulation.

To prevent damage to any cords or connectors when disconnecting, always grasp and pull by the connector and not the cord.

Do not operate the Power Supply or Mobile Computing Workstation with damaged cords or connectors. Please replace the damaged component immediately. Contact InterMetro Customer Service for replacement parts and service.

**Caution:**

To reduce the risk of electric shock, unplug the Power Supply AC cord from an AC outlet and switch the ON/Extended Storage Switch to the Extended Storage (OFF) position before attempting any maintenance or cleaning. Turning off computers or disconnecting the AC power cord alone will not reduce the risk of electric shock because the Power Supply is internally powered by a battery.

**Warning: Risk of Electric Shock**

The AC power cord is the only means to disconnect the Power Supply and Metro Series Mobile Computing Workstation from the AC power grid (mains). The ON/Extended Storage Switch on the Power Supply does not disconnect from main power.

On the other side, the Power Supply employs a Lithium-Ion Nano Phosphate (LiFePO₄) battery or SLA to provide mobile DC output power. Low voltage (10-16 VDC) DC power is available from the Power Supply even when the AC cord is disconnected from an AC outlet. To remove DC power, put the ON/Extended Storage Switch in the Extended Storage (OFF) position.

**DANGER: Risk of Explosion**

The Mobile Computing Workstation and the Power Supply are not for use in hazardous (classified) locations. Do not use the Mobile Computing Workstation, nor recharge the Power Supply battery, in oxygen enriched areas; areas where flammable anesthetics are used or stored; or any other hazardous, classified location.

**Caution (USA 240 V):**

If an MPS-4009 Power Supply is connected to a 240 V supply system in the United States of America (USA), it shall be a center tapped single phase supply circuit.



Electromagnetic Interference (EMI) Recommendations

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to other devices in the vicinity. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does not cause harmful interference to other devices, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving device.
- Increase the separation between the equipment.
- Connect the equipment to an outlet on a circuit different from that to which the other device(s) are connected.
- Consult the manufacturer or field service technician for help.

Revision History

REV/ Issue	Revision Description	Date	Approved
A	Initial Release	10-24-2012	Karl Haiden
B	1) Updated graphics in Pages-23, 25, 26, 29 2) Page-4 Symbol Explanation Section "Attention, consult accompanying documents" logo is changed to "Open Book"	03-22-2013	Karl Haiden
C	Page 44: Removed Wine Glass label from "Shipment of Power Supply" Section as per Emerson Corporate Directives	11-09-13	Karl Haiden
	Page 5: Added Battery Service Label (C05-1100)	02-07-14	Karl Haiden
D	1) CRN 15-057 Action Item to remove BatteryPro content from the manual. 2) Updated References in Page 9.	02/24/15	Karl Haiden

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References

Document Number	Title
L01-502	Flo 1700 Series Mobile Computing Workstation Operations Manual
L01-503	Flo 1800 Series Mobile Computing Workstation Operations Manual
L01-565	BatteryPro V3.6.10.0 Instructions for Use

Introduction

Mobile Rechargeable Power Supply

The Metro MPS-4009 Power Supply can consist of one the following chemistries:

- Lithium Ion Nano-Phosphate (Li-Nano or LiFePO4)
- Sealed Lead Acid (SLA)
- LiFePO₄ battery made by China Aviation Lithium Battery (CALB)

These rechargeable power sources can all be utilized for the Metro Series Mobile Computing Workstations. The Metro Multi-Chemistry Power Supply is a fully automatic power supply charger system with a nominal DC output voltage of 12 Volts (V) and a battery capacity of 512 to 540 Watt-hours (Wh) depending on chemistry. When plugged into an AC outlet, it supplies the Mobile Computing Workstation system equipment while also charging the cells. When unplugged from the outlet, the power supply switches automatically to supply the workstation equipment from the internal Multi-Chemistry rechargeable battery cells. The power supply is designed for continuous operation and service is not interrupted by plugging in or unplugging the power supply.



MPS-4009 Power Supply

Power Supply Status

The status of the MPS-4009 Power Supply is displayed by a remote Fuel Gauge display and optionally on the workstation monitor by the Metro BatteryPro software.

Remote Fuel Gauge Display

The remote Fuel Gauge is embedded in the Metro Series Mobile Computing Workstation monitor mount at eye level height and is connected to the power supply. It displays the battery charge level and state with a series of LED indicators.



Remote Fuel Gauge Display

Metro BatteryPro Mobile Computing Workstation Power Supply Management Software

In a manner similar to notebook computer battery monitors, Metro BatteryPro Mobile Computing Workstation Power Supply Management Software displays the MPS-4009 Power Supply status, battery level as a percentage, and calculated remaining run time. The status is displayed on the Workstation display monitor using the Windows task bar and control panels. Metro BatteryPro also alerts the user when the power supply batteries are reaching the end of the discharge cycle so that the user can perform any one of three actions:

1. Save any work and shut down the system.
2. Allow the computer to shut down in an orderly manner with all data quickly stored onto the hard drive for Hibernation.
3. Plug the power supply into a wall outlet to start charging the unit.

Features

The Metro MPS-4009 Multi-Chemistry Power Supply features:

- Rugged steel construction – built to last.
- Remote Fuel Gauge at the user's eye level.
- Multi-Chemistry, 512 to 540 Watt-hours (Wh) capacity rechargeable batteries.
- Fits conveniently in the base of the Flo Series Mobile Computing Workstations.
- Software application Metro BatteryPro provides the power supply status on the Metro Series Mobile Computing Workstations monitor display.
 - Status icon on Windows taskbar
 - Desktop status window
 - Power Properties dialog to configure settings and view diagnostic data.
- Compatible with Flo 1700 and 1800 series Mobile Computing Workstations.
- Standard Human Interface Device (HID) USB connection between MPS-4009 Power Supply and workstation computer.
- User manual supplement included.

Equipment Classification

The Metro MPS-4009 Li-Nano Power Supply is TÜV certified with respect to electric shock, fire and mechanical hazards only in accordance with UL 60601-1, CAN/CSA 22.2 No. 601.1 and IEC/EN 60601-1-1 as Type B Patient Care Medical Equipment suitable for use in patient vicinities.

The MPS-4009 Multi-Chemistry Power Supply is a Class I Equipment that is also internally powered.

According to the degree of protection against electric shock, it is a Type B applied part.

According to the degree of protection against ingress of water the MPS-4009 Multi-Chemistry Power Supply is considered ordinary.



Warning: Risk of Explosion

The MPS-4009 Multi-Chemistry Power Supply is not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.

The MPS-4009 Multi-Chemistry Power Supply is suitable for continuous operation.

Important Product Notices

The MPS-4009 Multi-Chemistry Power Supply is a subsystem component of the Metro 1700 and 1800 Series Mobile Computing Workstations. Please refer to the respective User Guide for the Mobile Computing Workstation to which the Power Supply is attached for additional information.

The MPS-4009 Multi-Chemistry Power Supply is only TÜV certified if the equipment is left in its original configuration as shipped from InterMetro Industries Corporation. If the user alters the power supply by changing components on or adding components to the power supply, this will void the TÜV certification of the power supply and the CSA certification of the Mobile Computing Workstation and is expressly prohibited by InterMetro Industries Corporation.

The Power Supply used is provided with a "Hospital Grade" or "Hospital Only" attachment plug for connection to the AC supply circuit.

To ensure equipment grounding reliability, the Power Supply should only be connected to AC outlet receptacles which are marked "Hospital Grade" or "Hospital Only". Where the integrity of the external protective earth connector arrangement is in doubt, equipment shall be operated from its internal electrical power source.

Disposal

Steel and Aluminum sections of the power supply as well as LiFePO₄ batteries can be disposed of or recycled.

Lead acid batteries must be recycled in accordance with local, state and federal regulations.

Electronic components or printed circuit boards, etc., shall be disposed of in accordance with local, state and federal regulations.

For further information call InterMetro Customer Service.

Getting Started

Installation

In general, the Metro MPS-4009 Multi-Chemistry Power Supply System is provided already installed on a Metro Mobile Computing Workstation and is ready for use after preparing and fully charging the batteries.

The MPS-4009 Multi-Chemistry Power Supply System can be retrofitted or installed new on a Metro Mobile Computing Workstation. The power supply is self-contained and is attached using the correct mounts on the bottom of the Metro Mobile Computing Workstation base. Metro BatteryPro is ready to install on the workstation computer. Instructions for installing an MPS-4009 Power Supply and Metro BatteryPro are provided in “MPS-4009 Power Supply System Installation” below.

Unpacking	If ordered separately, the MPS-4009 Multi-Chemistry Power Supply will arrive fully assembled at the customer's site in a cardboard box. After cutting open the box, lift the MPS-4009 out of the box.
Inspection	After the MPS-4009 Multi-Chemistry Power Supply has been unpacked, the user should inspect the unit for any shipping damage. If there is any damage, please contact InterMetro Customer Service immediately.

Battery Preparation



Caution:

Before placing the MPS-4009 Multi-Chemistry Power Supply into service on a Metro Series Mobile Computing Workstation, the Lithium Ion cells must be connected. Depending on the shipment, they may not be connected due to USDOT and IATA regulations. Please see “Connecting the Power Supply Batteries” in “Maintenance and Storage” below.

Charging the Power Supply Battery

Before placing a Metro Series Mobile Computing Workstation into service for the first time with the MPS-4009 Multi-Chemistry Power Supply, the power supply battery should be initially charged for a full 24 hours. To charge the battery, plug the coiled AC power cord into an AC outlet and put the ON/Extended Storage Switch into the “ON” position (see “Powering Up the MPS-4009 Multi-Chemistry Power Supply” below). For further information on the charge indicator lights of the Remote Fuel Gauge, please refer to the “Remote Fuel Gauge” section below.

After the initial charge, the charge time from a completely discharged battery is typically 2 hours in fan mode and 3 hours in fan less mode with LiFePO₄ and 4 hours for SLA regardless of fan mode.

Powering Up the MPS-4009 Multi-Chemistry Power Supply

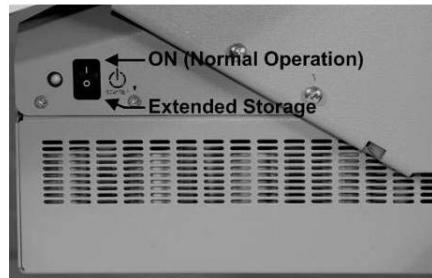
The MPS-4009 Multi-Chemistry Power Supply is controlled by the “ON/Extended Storage” Switch located on the side of the unit.

ON/Extended Storage Switch

In the “ON” position, the power supply provides power to the Metro Series Mobile Computing Workstation systems. If the workstation is not used for an extended period of time, the ON/Extended Storage Switch should be put in the “Extended Storage” (OFF) position. The switch position disconnects the battery from any internal or external equipment and avoids deep discharges of the battery, which can cause damage to the battery.

Notice:

If the MPS-4009 Multi-Chemistry Power Supply has been switched to “Extended Storage” for more than 1 week, connect the workstation to AC to wake up the power supply before switching it to “ON”.



ON/Extended Storage Switch



Warning: Risk of Electric Shock

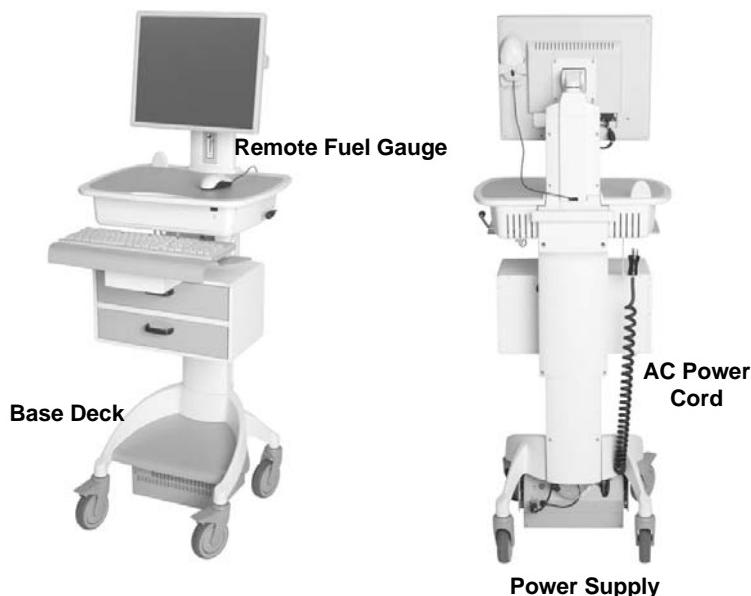
The Power Supply employs a Lithium Ion Nano-Phosphate (Li-Nano) battery to provide mobile DC output power. Low voltage (11-15 VDC) DC power is available from the Power Supply even when the AC cord is disconnected from an AC outlet. To remove DC power, put the ON/Extended Storage Switch in the “Extended Storage” position.

Operation

The following section describes the basic function and operation of the MPS-4009 Multi-Chemistry Power Supply System.

Power Supply Location on the Metro Series Mobile Computing Workstation

The MPS-4009 Multi-Chemistry Power Supply is located in the bottom of the Metro Series Mobile Computing Workstation under the Base Deck. The Remote Fuel Gauge located on the monitor stalk and the AC Power Cord associated with the Power Supply is also indicated.



Flo 1700 Series Base Showing Location of Power Supply

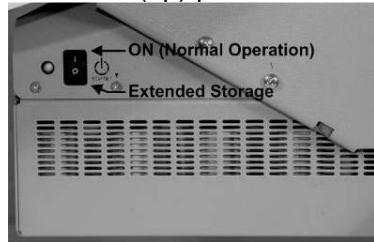


Caution:

Before using the equipment for the first time, the Multi-Chemistry cells may need to be connected. They may not be connected during shipment due to USDOT and IATA regulations. See “Connecting the Power Supply Batteries” in “Maintenance and Storage” below.

Powering Up the MPS-4009 Multi-Chemistry Power Supply

To turn on the Power Supply, flip the ON (Normal Operation)/Extended Storage switch located on the side of the power supply to the “ON” (up) position.



Metro MPS-4009 Multi-Chemistry Power Supply “ON/Extended Storage” Switch

Important Notice:

If the MPS-4009 Multi-Chemistry Power Supply has been switched to “Extended Storage” for more than 1 week, connect the workstation to AC to wake up the power supply before switching it to “ON”.

Remote Fuel Gauge

To display the charge level of the Multi-Chemistry cells when operating on DC power, a Remote Fuel Gauge is connected to the power supply. The embedded Remote Fuel Gauge is located just below the monitor in the stalk and gives the user the current battery status at eye level height.



Remote Fuel Gauge

If the battery is fully charged, all five (5) amber LEDs are illuminated. The LEDs always display the battery charge level whether the computer is operating or not. As the battery loses charge, the LEDs gradually turn off, one at a time. Once the top four LEDs are off and only the amber LED marked “LOW” is illuminated and flashing, it is recommended to plug the AC cord into an AC outlet as soon as possible to charge the battery.



Notice:

Once the amber LED marked “LOW” starts to flash, plug the power supply into an AC outlet to avoid loss of system power, which may cause loss of data.

Notice:

Once the Multi-Chemistry Power Supply has been plugged into an AC outlet, the Remote Fuel Gauge two green LEDs marked “AC” and “CH” turn on.

Charge Status Seven (7) multi color LEDs (green, amber) located on the Remote Fuel Gauge display the charging status of the Multi-Chemistry power supply.

Fuel Gauge	Status
	Battery is discharging under normal, mobile operation. Example shown is down to about 50% charge remaining.
	Low battery LED flashing: plug power supply into AC immediately.
	AC indicates the power supply is plugged into the wall AC. CH indicates the battery is charging. AC and CH LED must be ON. The amber LEDs will turn on in sequence to indicate the charging status. Example shown is up to about 50% charged.
	AC indicates the power supply is plugged into the wall AC. The Amber LEDs indicate the battery is fully charged. Note that the CH LED is not lit because the battery is not being charged since the cycle is complete.

Flashing LEDs Additional patterns with flashing of the LEDs indicate a problem with the MPS-4009 Power Supply. Please see “Troubleshooting” in “Maintenance and Storage” below for additional information.

Charge Time Charge time for fully depleted batteries depends on the amount of load connected to the power supply.

Typically it takes 2 hours in fan mode and 3 hours in fan less mode with LiFePO4 and 4 hours for SLA regardless of fan mode to fully charge a completely depleted battery, if the load of cart electronics is less than 50 Watts. For a greater load, charging will take longer:

Examples:

1. Workstation electronics load is in a range greater than 120 Watts. The power supply can only provide less than 13A to charge 2 battery packs. Current will be reduced depending on output load.
2. Charging current will resume once output load dropped.

Upon completion of the charge cycle, all 5 amber LEDs will be illuminated and the green CH (charge) LED will turn off, indicating that the batteries of the power supply are fully charged.

Notice: If the Mobile Computing Workstation will not be used for an extended period of time, ensure the ON/Extended Storage Switch is set to the “Extended Storage” (OFF) position. If the power supply is left in the “ON” position, the workstation equipment will continue to draw power and deep discharge the battery.

Notice: If the Mobile Computing Workstation is to be placed in long term storage (longer than one week), the Power Supply should be fully charged before placing the “ON/Extended Storage” switch in the “Extended Storage” (OFF) position.

Notice: MPS-4009 Multi-Chemistry Power Supply enters sleep mode after one week in Extended Storage.

If the MPS-4009 Multi-Chemistry Power Supply has been switched to “Extended Storage” (OFF) for more than 1 week, connect the workstation to AC to wake up the power supply before switching it to “ON”.



Warning: Risk of Electric Shock

The Power Supply employs a battery to provide mobile DC output power. Low voltage (10-15 VDC) DC power is available from the Power Supply even when the AC cord is disconnected from an AC outlet. To remove DC power, put the ON/Extended Storage Switch in the “Extended Storage” (OFF) position.

MPS-4009 Power Supply System Installation

In general, the Metro MPS-4009 Multi-Chemistry Power Supply is provided already installed on a Metro Mobile Computing Workstation and is ready for use.

The MPS-4009 Multi-Chemistry Power Supply can be retrofitted, replaced or installed new on a Metro Mobile Computing Workstation. The power supply is self-contained and is attached using the correct mounting hardware and cables on the bottom of the Metro Mobile Computing Workstation base.

For additional help, contact InterMetro Customer Service.

Hardware Installation

Mounting the MPS-4009 Power Supply



Caution:

For safety, only qualified service personnel should perform the following procedure to mount the MPS-4009 Power Supply on the Metro Mobile Computing Workstations.

To mount the MPS-4009 Power Supply to the workstation base as a new or replacement to an existing power supply, perform the following steps:

Notice: All handle brackets, screws and other hardware used in this procedure are usually taken from a previous power supply mounted on the workstation. If replacement hardware is needed, please contact InterMetro Customer Service.

1. Attach two handle brackets, one on each side of the power supply using three 8-32 pan head screws. Be sure to put the right-hand bracket on the right side and left-hand on the left side (the ramp tabs should be at the low end of the slant and to the outside).
2. Facing the back of the workstation, align the handle brackets inside the power supply mounts on the bottom of the workstation base. Lift the power supply up and move toward the front of the workstation, sliding the handle brackets up the ramp of the mounts, until the tabs on lower ends of the brackets drop and catch in the slots on the mounts.
3. Secure each side with two 8-32 pan head screws.
4. Ensure that the batteries are connected. See "Connecting the Power Supply Batteries" below.
5. Connect All Cables:
DC Power connector, RJ45 cable to the Gauge port, USB to the USB-B port and AC cable (Note that USB connection is required for use with Metro BatteryPro). Secure the AC cable with the clamp to the ground stud on the back of the power supply.

Removing the MPS-4009 Power Supply



Caution:

For safety, only qualified service personnel should perform the following procedure to remove the MPS-4009 Power Supply from the Metro Mobile Computing Workstations.

To remove the MPS-4009 Power Supply from the workstation base for replacement, perform the following steps:

Notice: Save all handle brackets, screws and other hardware that are removed by this procedure for the replacement power supply to be mounted on the workstation. If replacement hardware is needed, please contact InterMetro Customer Service.

1. Disconnect all cables: DC Power connector, RJ45 cable from the Gauge port, USB from the USB-B port and AC cable. Remove the AC cable clamp from the ground stud on the back of the power supply.
2. Disconnect the batteries when shipping the power supply. See "Disconnecting the Power Supply Batteries for Shipment" below.
3. Remove the two 8-32 pan head screws from the workstation power supply mounts on each side.
4. Facing the back of the workstation, lift the power supply up to free the tabs from the slots on the mounts on the bottom of the workstation base. Slide the handle brackets down the ramp of the mounts and lift out the power supply.
5. Remove the three 8-32 pan head screws from each of the two handle brackets on each side of the power supply.

Notice: The handle bracket hardware must be removed and the batteries must be disconnected before returning the power supply to InterMetro Industries Corporation.

Software Installation

The Metro BatteryPro software application installation file contains all drivers and applications for Metro BatteryPro operation.

Notice: Typically, the Metro BatteryPro Mobile Computing Workstation Power Supply Management software and drivers are installed at the factory and no additional installation is required.

Notice: The software package should already be installed on the workstation computer before plugging in the USB cable.

Refer to literature document L01-565 for BatteryPro software installation guide.

Maintenance and Storage

Cleaning

Use 70 percent isopropyl alcohol (IPA) diluted with water for cleaning the power supply. You may also use one of these products to clean the power supply:

- Cidex
- Clorox Clean-Up
- "Green soap" United States Pharmacopoeia (USP)
- Formula 409
- Sani-Cloth. Plus
- Virustat TBQ

Ensure that the power supply is off and unplugged. Apply 70 percent isopropyl alcohol to a clean nonabrasive cloth and then wipe the power supply enclosure. Cleaners applied directly to the power supply enclosure could leak inside and cause damage. Be careful not to splash solvents on the power supply enclosure.

Connecting the Power Supply Batteries

Notice:

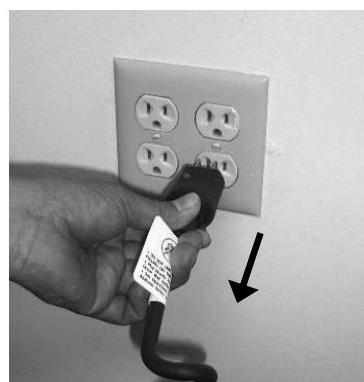
The following procedure for Connecting the Power Supply Batteries applies only to Metro Series Mobile Computing Workstation equipped with the Multi-Chemistry Power Supply (MPS-4009). The battery cells may or may not be connected during shipment due to USDOT and IATA regulations. The procedure is required immediately after unpacking before powering up and using the workstation for the first time.

**Caution:**

Only qualified service personnel should perform the following procedure for Connecting the Power Supply Batteries.

Ensure Power Supply is off

- Ensure the AC cable is disconnected from the wall outlet.



- Ensure Normal Operation/Extended Storage switch of the Power Supply is in the Extended Storage (Standby: down) position.



Power Supply switch down to Standby

Open the Battery Connector Access Panel

Notice: On some models Metro Series Mobile Computing Workstation it may be necessary to access the Power Supply on the back by opening a cover door at the bottom of the cart.



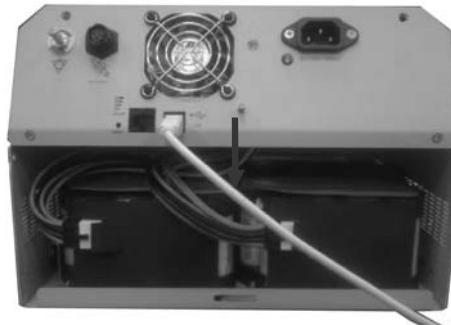
Open Power Supply Cover Door As Required

- Remove screws on sides of power supply that hold the Battery Connector Access Panel.



Power Supply Rear View

- Remove access panel to access the battery connector as shown in picture below.



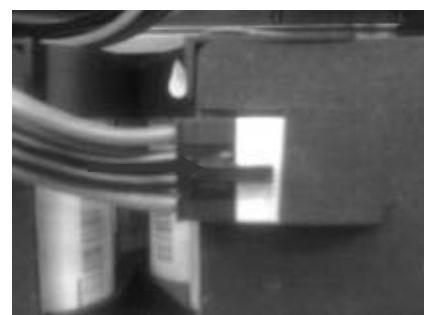
Battery Connector

Connect the Battery Cells

- At each connector, firmly grip the cable plug between thumb and index finger. Line up the plug with the socket below it and insert it downward all the way until the latch locks completely. The latch should click into place.



Line up Cable Plug with Socket



Push Cable Plug firmly into Socket until clip locks

- Check that all connections have been made and properly seated with latches locked. There are up to of 2 battery pack connectors in an MPS-4009 Multi-Chemistry power supply.



Properly seated connections

Close the Battery Connector Access Panel

- Rotate the Battery Connector Access Panel back up, pushing until the top is firmly seated against the case.
- Re-install the screws on sides of power supply that hold the Battery Connector Access Panel.

Disassembly and Assembly Procedure of Power Supply Batteries

SLA (Sealed Lead Acid Battery) Disassembly Procedure

1. Remove access panel to access the battery connector as shown in figure below.



Removal of Access Panel

2. Firmly grip the cable plug between thumb and index finger as shown below. Press the tab on the battery terminal and remove it.



Unplug Cable Plug

3. Firmly pull out the battery tray to observe the 3 SLA batteries and remove positive/negative battery terminals and the unused connector from the rubber band on the SLA battery.



Pull Out Battery Tray

4. Release the Velcro straps tray in order to remove the 3 SLA batteries.



Remove Velcro Straps

SLA (Sealed Lead Acid Battery) Assembly Procedure

1. Place battery tray with Velcro straps on a secure or grounded table as shown in figure below.



Battery Tray with Velcro Straps

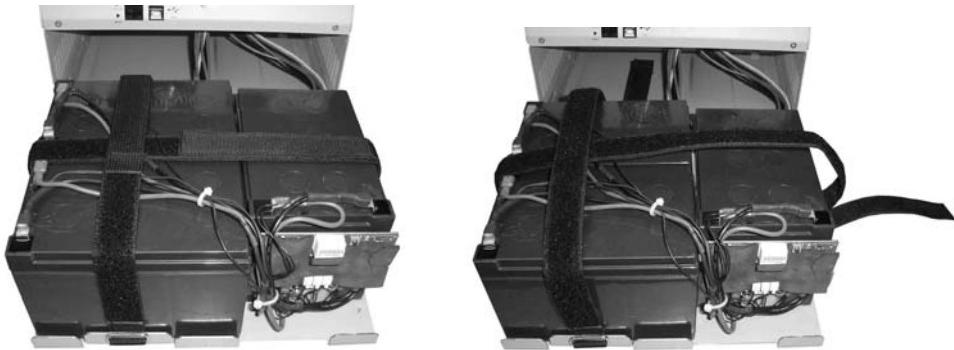
2. Install 2 SLA batteries on the battery tray horizontally as shown below. On the third SLA battery, make sure a rubber band is place around the battery as shown below. The rubber band will be used to secure the extra battery connector.



Installation of SLA Batteries

3. Place the third SLA with rubber band wrapped around it vertically next to the other two SLA batteries as shown below. Connect all positive and negative battery terminals to the SLA's.

Note: Check all positive and negative terminals for accuracy. Tighten the Velcro straps to secure the SLA batteries on the battery tray.



Connect Terminals to SLA Batteries

4. Install the battery tray inside the Green Cubes Power Supply compartment as shown in figure below.



Installation of Battery Tray

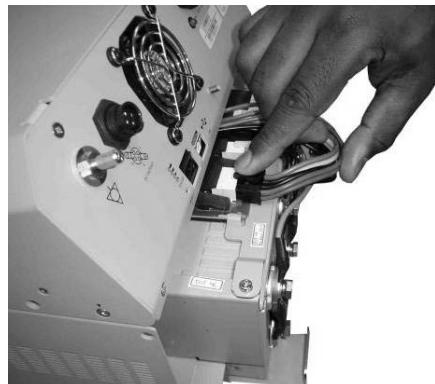
LiFe Mid-Grade (CALB) Battery Disassembly Procedure

1. Remove access panel to access the battery connector as shown in figure below.



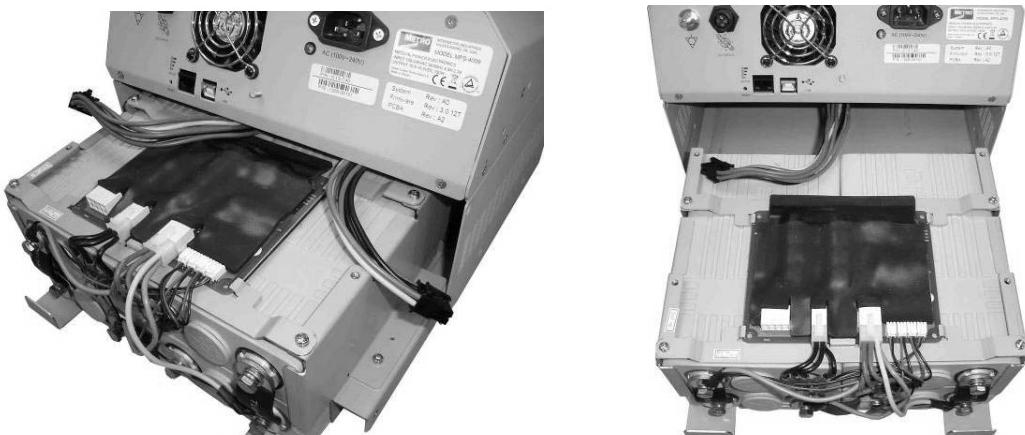
Removal of Access Panel

2. Firmly grip the cable plug between thumb and index finger as shown below. Press the tab on the battery terminal and remove it.



Unplug Cable Plug

3. Pull out the battery tray to remove the CALB battery.



Pull Out Battery Tray

LiFe Mid-Grade (CALB) Battery Assembly Procedure

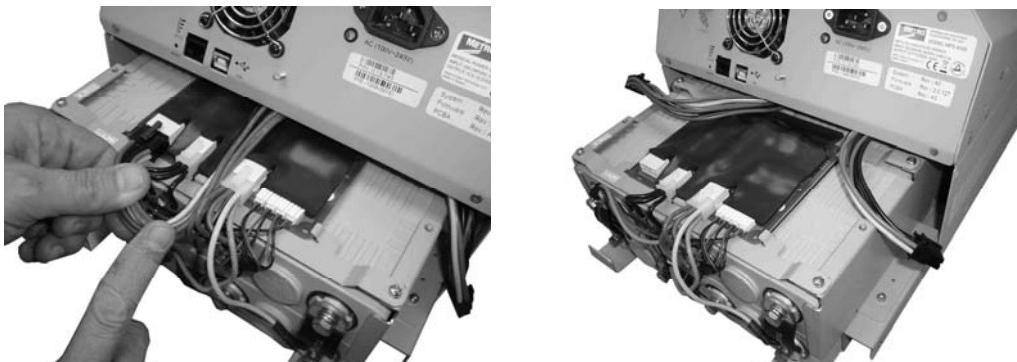
1. Align CALB battery with power supply enclosure and secure battery connector as shown in figure below.



Align CALB Battery

2. Firmly grip the cable plug between thumb and index finger as shown below. Press the tab on the battery terminal and insert it.

Note: Secure the battery connector cable as well.



Plug Battery Connectors

3. Install the battery tray inside the Green Cubes Power Supply compartment as shown in figure below.



Installation of Batteries

Storage and Transport Conditions

Environmental conditions for shipping and storage are:

- Ambient temperature range of -40°C to +70°C (-40°F to 160°F).
- Relative humidity range of 10% to 100%.
- Atmospheric pressure range of 14.76 in. Hg to 31.29 in. Hg.

Shipment of Power Supply

The MPS-4009 Power Supply is available in 3 battery chemistry options. Depending on the battery chemistry, the preparation of the shipment is different.

Lithium Nano Phosphate Battery (Li-Nano)

Non Class 9 Shipment:

In the USA the Li-Nano batteries can be disconnected from the power supply for a regular Ground shipment. The shipping container must have the following marking:



Class 9 Shipment:

Outside the USA in any shipping mode and air or sea transport inside the US, the power supply must be shipped as fully regulated Class 9 (Hazardous Material / Dangerous Goods). In this shipping mode the batteries can be connected or disconnected. The shipper must be certified for Li-Ion Class 9 shipments. The power supply must be shipped per UN3481 Lithium ion batteries contained in equipment on cargo aircraft only.

Typically, a power supply contains two battery packs. Ratings below given per battery pack:

Per battery pack:

Battery weight: 2.75 kg
Wh rating: 264 Wh
Equivalent Li Content (ELC): 24 g

LiFe Mid-grade Battery (CALB)

The LiFe Mid-grade Battery can be connected or disconnected and requires a fully regulated Class 9 shipment in any shipping mode. The shipper must be certified for Li-Ion Class 9 shipments. The power supply must be shipped per UN3481 Lithium ion batteries contained in equipment on cargo aircraft only.

The power supply contains one battery pack. Ratings below given per battery pack:

Per battery pack:

Battery weight: 7.33 kg
Wh rating: 512 Wh
Equivalent Li Content (ELC): 48 g

SLA

The SLA battery is not considered a Hazardous Material (Dangerous Goods) and there is no restriction on shipping the SLA batteries.

Troubleshooting

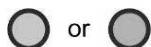
General Tips

- If a problem occurs while you're working, stop immediately. If you continue, you may lose data and destroy problem-related information.
- Observe what is happening. Write down what the power supply, workstation computer and other devices are doing as well as what actions you took immediately before the problem occurred.
- What appears on the workstation monitor? Record or capture a screen image of any messages that occur.
- Carefully read popup messages, especially if you are also using Metro BatteryPro: they generally contain information that gives a solution to the problem that occurs. Please refer also to the Metro BatteryPro Users Manual if it is in use.
- What programs and/or optional devices are you using on the workstation?
- See if you can cause the problem to occur again. This may help you understand the source of the problem and will help you describe the problem if you must call InterMetro Customer Service for technical assistance.
- What LEDs on the Fuel Gauge are illuminated or flashing? See also the "Fuel Gauge Warnings" below.
- Do you hear any beeps? How many? Are they long or short?
- Check the power supply fuse. Is it intact?

Fuel Gauge Warnings

The Power Supply Fuel Gauge flashes LEDs to indicate a detected problem.

Fuel Gauge warning LED indication legend:



Yellow or Green: flashing LED



Grey: LED off



White: On or Off: the state does not matter: ignore the LED



LOW LED flashing: Battery nearing end of charge

- Plug power supply into AC immediately.



Warning 1: Power supply overheating, AC-DC module

- Air flow in the power supply may be restricted due to cooling fan not working properly, fan blocked, or clogged ventilation slots around the power supply case.
- Turn off computer equipment and then the power supply.
- Check that the fan is not blocked. Check the ventilation slots around the power supply case for dust build-up and clean.
- Turn on the power supply and restart the computer equipment.
- If this problem continues, contact InterMetro Customer Service.



Warning 2: Power supply overheating, DC-DC module

- Air flow in the power supply may be restricted due to cooling fan not working properly, fan blocked, or clogged ventilation slots around the power supply case.
- Turn off computer equipment and then the power supply.
- Check that the fan is not blocked. Check the ventilation slots around the power supply case for dust build-up and clean.
- Turn on the power supply and restart the computer equipment.
- If this problem continues, contact InterMetro Customer Service.



Warning 5: Battery pack overheating, critical

- System will shut down in 2 minutes.
- Immediately turn off computer equipment and then the power supply.
- Let cool for 2 hours.
- Turn on the power supply and restart the computer equipment.
- If this problem continues, contact InterMetro Customer Service.



Warning 6: Power Supply Low temperature

- System temperature below 0 °C (32 °F) has been detected. Ambient temperature is below operating range, temperature sensor has failed or has become disconnected.
- If power supply or its workstation are in an area where the temperature is below 0 °C (32 °F - freezing), move to an area of ambient temperature above 0 °C (32 °F - freezing), otherwise,
- Turn off computer equipment and then the power supply.
- Turn on the power supply and restart the computer equipment.
- If this problem continues, contact InterMetro Customer Service.



No Battery Warning

- No battery packs are detected in the power supply. Battery packs most likely were not connected before the power supply was placed into service.

Notice: The battery cells may not be connected during shipment due to USDOT AND IATA regulations.

- Turn off computer equipment and then the power supply.
- Make sure battery packs are connected by performing procedure in "Connecting the Power Supply Batteries" above.
- Turn on the power supply and restart the computer equipment.
- If this problem continues, contact InterMetro Customer Service.



Warning 7: Short Circuit or Overload

- Power supply overloaded.
- Immediately turn off the power supply.
- Check your workstation cart for a possible short or overload.
- Turn on the power supply and restart the computer equipment.
- If this problem continues, contact InterMetro Customer Service.



Warning 10: Power supply overheating, Charger module

- Air flow in the power supply may be restricted due to cooling fan not working properly, fan blocked, or clogged ventilation slots around the power supply case.
- Turn off computer equipment and then the power supply.
- Check that the fan is not blocked. Check the ventilation slots around the power supply case for dust build-up and clean.
- Turn on the power supply and restart the computer equipment.
- If this problem continues, contact InterMetro Customer Service.

Technical Specifications

Input Voltage	100 - 240 VAC, 50/60 Hz, 4.6 to 2.3 A
Output Voltage	11 – 15 V
Maximum Output Power	150 W Continuous, 200 W Peak
Battery Type	<ul style="list-style-type: none">• Li-Nano (Lithium-Ion Nano Phosphate, LiFePO₄)• LiFePO₄ Mid-Grade CALB• Sealed Lead Acid (SLA)
Short Circuit Protection	30 A fuse on PCB (User Inaccessible)
Battery Capacity	<ul style="list-style-type: none">• Li-Nano (full load of 2 battery packs) = 528 Wh• SLA (full load of 3 battery packs) = 540 Wh• CALB (full load of 4 battery packs) = 512 Wh
Charging Time	2 hours Fan with < 50 W Load 3 hours Fanless with < 50 W Load
Operating Temperature	10 °C to 30 °C (50 °F to 86 °F)
Charge Status Indicator	LED on remote fuel gauge
Outlet rating	Charge 10 carts per 20 A circuit
Weight	<ul style="list-style-type: none">• Power Supply with Li-Nano (Lithium-Ion Nano Phosphate, LiFePO₄) = 23.8 lbs.• Power Supply with SLA (Sealed Lead Acid Battery) = 42.2 lbs.• Power Supply with mid-grade LiFe (CALB - China Aviation Lithium Battery) = 24.3 lbs.
Approvals	FCC Part 15 Subpart B, Class A, Industry Canada Class A UL60601-1 and CSA C22.2 No. 601.1 IEC/EN 60601-1-1 (Safety, Medical Equipment) IEC/EN 60601-1-2 (EMC, Medical Equipment) RoHS compliant (RoHS Directive 2002/95/EC)

Contacting InterMetro Industries Corporation

InterMetro Industries Corporation Contact Information

InterMetro Industries Corporation

651 North Washington Street
Wilkes-Barre, PA 18705
Phone: 1-800-992-1776
<http://www.metro.com/support>

InterMetro Customer Service

For all customer service related issues, or if you need technical assistance, please call our customer service department at:

1-800-992-1776	Americas
905 676 9890	Canada
+31 76 58 77550	Europe
+9714 811 8286	Middle East
+65 6550 1291	Asia-Pacific

Repair

Power Supply:



To return equipment for repair:

- Have model and serial numbers ready: obtain either the Power Supply information from its label or the Workstation information from its label as shown at left.
- Contact InterMetro Customer Service at the contact number given above to obtain a RMA number.
- Please write the RMA number on the air bill in the reference section on the outside of the package.
- Return the equipment to:

InterMetro Industries Corporation
3263 Elam Farms Pkwy
Murfreesboro, TN 37127